DOCUMENTS EXPEDITING PROJECT

85th Congress
1st Session

COMMITTEE PRINT

REVIEW OF VOLUNTARY AGREEMENTS PROGRAM UNDER THE DEFENSE PRODUCTION ACT

EXPANSION OF TUNGSTEN SUPPLY

REPORT DATED NOVEMBER 8, 1957

BY THE

ATTORNEY GENERAL

COMMITTEE ON BANKING AND CURRENCY
UNITED STATES SENATE

NOVEMBER 19, 1957

Printed for the use of the Committee on Banking and Currency

UNITED STATES
GOVERNMENT PRINTING OFFICE
98504 WASHINGTON : 1957

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CONTENTS

	Page
Statement of the chairman	v
Part 1.—Defense expansion of tungsten supply:	
I. The tungsten industry	2
A. Properties and uses of tungsten	2
B. Distribution of tungsten supply	4
1. Geographic distribution	4
2. Composition of the industry	5
II. The Government's tungsten expansion program	6
A. Need for a program	6
B. Government agencies responsible for the program	6
C. Conservation, priorities, and allocations	8
D. The domestic purchase program	8
1. Price ceilings	9
2. Floor price program	10
E. The foreign purchase program	12
F. Tax amortization	14
G. Exploration assistance	15
H. Other types of assistance	16
1. Purchases for the national stockpile	16
2. Loans, guaranties, and advances	16
I. Summary of financial aspects of the program	17
III. Conclusions	18
Part 2.—Voluntary agreements and programs under the Defense Production Act:	
A. Foreign petroleum supply agreement	20
B. Army integration committees	20
C. Contribution of tanker capacity	21
D. USIA classified agreement	22
Appendix: Tables 1 through 9, inclusive	23

CONTENTS

Page

STATEMENT OF THE CHAIRMAN

Under section 708 (e) of the Defense Production Act of 1950, as amended, the Attorney General is directed to review the administration of that act. This review is for the purpose of determining any factors which may tend to eliminate competition, create or strengthen monopolies, injure small business, or otherwise promote undue concentration of economic power in the course of administration of the act.

The Defense Production Act amendments of 1955 require the Attorney General to report under section 708 (e) of the act at least once every 3 months, and to include in these reports a statement on the continuing review, required of the Attorney General under the 1955 amendments, of the voluntary agreements approved under section 708 of the act.

Previous quarterly reports have been made available as committee prints, as follows:

February 28, 1956 (reports dated November 9, 1955; February 9, 1956, Tax Amortization Certificates in the Petroleum Industry; February 20, 1956);

August 10, 1956 (reports dated May 9, 1956; August 9, 1956, Tax Amortization Certificates in the Nitrogen Industry);

December 6, 1956 (report dated November 9, 1956, Government-Sponsored Industrial Research);

February 13, 1957 (report dated February 9, 1957 Stockpiling);

May 20, 1957 (report dated May 9, 1957, The Titanium Metal Industry);

August 28, 1957 (report dated August 9, 1957, The Nickel Industry).

The Attorney General's report dated November 8, 1957, contains the results of a study of the tungsten industry, and a review of recent activities under the voluntary agreements approved by the Director of the Office of Defense Mobilization and the Attorney General under section 708 of the Defense Production Act of 1950, as amended.

This report is of interest to the committee and the Senate and to the public.

J. W. FULBRIGHT, *Chairman.*

EXPANSION OF TUNGSTEN SUPPLY

Report of the Attorney General Pursuant to Section 708 (e) of the Defense Production Act of 1950, as Amended

NOVEMBER 8, 1957.

To the President of the United States of America and the Senate and House of Representatives of the United States of America in Congress assembled:

I have the honor to submit a report in compliance with section 708 (e) of the Defense Production Act of 1950, as amended. That provision directs the Attorney General to make—

> * * * surveys for the purpose of determining any factors which may tend to eliminate competition, create or strengthen monopolies, injure small business, or otherwise promote undue concentration of economic power in the course of the administration of this Act. Such surveys, and the reports hereafter required, shall include studies of the voluntary agreements and programs authorized by this section. The Attorney General shall submit to the Congress and the President within ninety days after the approval of this Act, and at least once every three months, reports setting forth the results of such surveys and including such recommendations as he may deem desirable.

In compliance with this direction, this reports in two parts (1) a study of the effects of defense expansion of tungsten supply upon the competitive status of the tungsten industry, and (2) the current status of outstanding voluntary agreements and programs which are under continuous review by this Department under section 708 (b) and (e) of the Defense Production Act.

PART 1

DEFENSE EXPANSION OF TUNGSTEN SUPPLY

This part of the report focuses on the status of competition in the tungsten industry under the impact of the defense production program. First, it considers the nature and uses of tungsten, particularly in relation to its special utility in defense production tools and in defense weapons. It then notes that domestic supplies of workable tunsten ore are scattered and have traditionally been insufficient for domestic needs. The domestic tungsten industry has been a relatively small part of the economy, and has not displayed a degree of concentration beyond that reasonably to be expected from the few commercial ore sources.

The report then turns to a consideration of the requirements estimates and the indicated shortages which gave rise to the defense expansion program in this industry in the Korean emergency; the various Government agencies which have carried responsibility for its operation; and the various use restrictions and allocation provisions which sought to husband supplies on hand. The domestic purchase program is then examined in detail as the principal tool used to expand the domestic defense production base for this commodity. The foreign purchase program, important in its development of new free world sources needed after the loss of the China reserves, the world's richest, is next briefly referred to. The remaining section examine in detail the less important incentive programs used to expand tungsten supply, principally the grant of accelerated tax amortization, minerals exploration contracts, stockpile purchases, and the loans, guaranties, and advances.

It concludes that, despite its controversial cost, the program displays no factors tending seriously toward concentration of economic power in this industry. Rather, the industry which emerged was not substantially altered from that which existed at the program's beginning.

I. The Tungsten Industry

A. PROPERTIES AND USES OF TUNGSTEN

Tungsten, also known as wolfram, is a steel-gray, extremely heavy metal, possessing many desirable properties. It has the highest melting point, 3,410° C., of any metal, and it retains great strength at high temperatures. It has great corrosion resistance and, while hard and difficult to machine, can be worked into ductile forms. As an alloying material, it imparts exceptional hardness to steel for industrial and military application. Tungsten carbide, formed by combining tungsten metal with carbon in high temperature metallurgical processes, is second only to the diamond in hardness, and finds a wide use as facing for cutting tools.

While much was known of the element tungsten (W) as early as 1781, it was not until the turn of this century that there were signifi-

cant industrial applications. Tungsten is now widely employed. One of its important uses is in tools used to cut or machine steels. High-speed tungsten alloy steel and, more particularly, tungsten carbide are used for this purpose. The hardness of tungsten compounds particularly adapts them for dies, rock-drill bits, oil well drilling equipment, and facing rolls for producing sheet metals. Their electrical properties make them useful in welding electrodes and electrical contact points. And, in a nuclear age, their density is highly important in X-ray targets and radiation shields. A small but vital percentage of tungsten is used as tungsten wire filaments in light bulbs and radio and television tubes. Tungsten chemicals are used in dyes, inks, paints, rubber, fluourescent lamps, and optical glass.[1]

In the military field, perhaps the most important use of tungsten is in cores for high velocity armor-piercing projectiles.[2] Its great heat resistance and strength make tungsten valuable in alloys for jet engines and guided missiles. Research is being conducted to obtain the optimum alloys for these purposes.

Domestic tungsten is mined by both open-pit and underground methods. Because of the nature and location of deposits, most of the ore is mined by the more expensive underground method. After leaving the mines, ores ordinarily must undergo a separation process referred to as milling or beneficiation. Since most of the ores contain only 0.25 to 2.5 percent tungsten trioxide (WO_3),[3] milling is employed to increase this content to at least 60 percent, and to remove impurities. Milling involves crushing, grinding, screening, and separation. Gravity, gravity-flotation, magnetic, and electrostatic processes are used. Of increasing importance are chemical processes. These make it possible to beneficiate lower grade ores.

The resulting tungsten concentrates, if of high quality, can be used directly in the making of steel alloys. In general, tungsten concentrates must undergo refining, which often involves complex chemical processes and powder-metallurgy, to produce ferrotungsten (mostly used in making steel), tungsten metal powder (mostly used for tungsten carbide), pure metal, and tungsten chemicals.[4]

In recent years, a marked shift has taken place in the consumption of tungsten concentrates. High speed tool steel [5] was the chief use of tungsten before World War II. In 1941, 95 percent was used for tool steels and 5 percent for metal powder, chemicals, and related products. Technological developments, conservation orders, and end-use restrictions in World War II led to the substitution of molybdenum in many tool steels and to increased use of tungsten carbide tools. By 1950, use of tungsten in ferroalloys had declined to 45 percent of total tungsten consumption. Conservation and end-use restrictions during Korean hostilities led to a low of 24 percent by 1952. On the other hand, metal powder, which had accounted for only some 5 percent of all tungsten consumed in 1941, increased to a peak of 76 percent in

[1] Bureau of Mines, U. S. Department of the Interior, Bull. No. 556, Mineral Facts and Problems, pp. 938–940 (1956).

[2] Apparently the Germans were the first to use such cores for projectiles in tank warfare during World War II. BDSA, U. S. Department of Commerce, Materials Survey, Tungsten, p. I–2 (1956).

[3] Bureau of Mines, U. S. Department of the Interior, 1 Minerals Yearbook 1190 (1953).

[4] BDSA, op. cit., supra, note 2, at pp. III–13–23.

[5] The most common is the "18–4–1" type consisting of 18 percent tungsten, 4 percent chromium, 1 percent vanadium and 0.50 to 0.80 percent carbon.

1952. Some three-quarters of the powder was used to produce tungsten carbide.

In 1955, 33 percent of tungsten was used in alloy steels and most of the balance in metal powder.[6]

Technological changes, Government conservation and end-use restriction orders, feared scarcities, and high prices have contributed to replacement of tungsten by substitutes in numerous applications. The tendency has been to retain these substitutes even after supplies of tungsten became plentiful and, in view of tungsten's checkered history as a "war baby," consumers have tended to design tungsten out of their products.[7] As noted, molybdenum has been substituted for tungsten in numerous tool steels.[8] Tungsten still remains the standard material for use in carbide tools, although titanium carbide is a potential substitute. It is anticipated, however, that new uses for tungsten will be developed, chiefly for high temperature applications. Accordingly, the long-term trend indicates increased consumption of this metal.[9]

B. DISTRIBUTION OF TUNGSTEN SUPPLY

1. Geographic distribution

Workable tungsten deposits have been found in many areas of the world. The wolframite ores (including huebnerite and ferberite) are more abundant than the scheelite, but the latter predominates in the United States. This country produces about three times as much scheelite as wolframite.[10]

World reserves of tungsten [11] are estimated at 175 million short-ton units of tungsten trioxide, equivalent to almost 3 billion pounds of tungsten.[12] China possesses about 75 percent of these reserves and the United States approximately 5 percent.

United States reserves of tungsten ores, ranging down to 0.3 percent of tungsten trioxide, are estimated at 9 million short tons. There are additional reserves of 5.5 million units contained in lower grade ores now considered submarginal, with tungsten trioxide content ranging down to 0.01 percent.[13] It may be noted that at the 1955 domestic production rate, the highest in our history, the higher grade ores would be exhausted in about 10 years and total reserves in about 15 years.[14]

The principal domestic reserves of tungsten ore are at Pine Creek Mine, California; the Mill City, Osgood Range, Tem Piute, and Rawhide districts, Nevada; the Ima Mine, Idaho; the Hamme Mine,

[6] BDSA, op. cit., supra, note 2, at pp. VI–7–8; Bureau of Mines, U. S. Department of the Interior, Preprint on Tungsten from Minerals Yearbook 7 (1955).

The foregoing does not take into consideration the utilization of scrap tungsten. No precise figures are available on consumption and supply of such scrap. Apparently, however, there is an established practice of returning scrap tool steel to producing plants, and perhaps more than one-half of the tungsten in steel alloys is in the form of scrap. Scrap is also saved by producers of wire and either sold or returned to chemical units. There is also a market for scrap tungsten carbide. Bull. No. 556, supra, p. 938.

[7] Id., at pp. 931, 938, 943.

[8] There was a 374 percent increase in use of molybdenum in high speed and tool steels in 1955 over 1949 as contrasted with a 25 percent increase in use of tungsten for these purposes. Preprint on Tungsten (1955), supra, p. 7.

[9] Bull. No. 556, supra, p. 932.

[10] Preprint on Tungsten (1955), supra, p. 2.

[11] See appendix table 1; BDSA, op. cit., supra, p. II–1.

[12] A short-ton unit is equivalent to 20 pounds of tungsten trioxide (WO_3). It contains 15.862 pounds of tungsten (W). A short ton of 60 percent WO_3 contains 951.72 pounds of tungsten. A metric ton of 60 percent WO_3 is equivalent to 1,048.95 pounds of contained tungsten.

[13] BDSA, op. cit., supra, note 2, at p. II–2. This estimate of total United States reserves of 14.5 million short ton units in 1954 may be compared to estimated reserves of 8.9 million units in 1943. Bureau of Mines, U. S. Department of the Interior, Minerals Yearbook 1187 (1947).

[14] If average production from 1946–50 is taken as the norm, United States reserves would be exhausted in some 40 and 60 years, respectively.

North Carolina; the Browns Lake deposit, Montana; and the Climax Mine, Colorado. The balance of the significant reserves is distributed among 30 smaller deposits. However, there are approximately 1,000 minor tungsten deposits in the United States.[15]

During the years 1925–54, domestic production came from 15 States and Alaska. Of these, 5 States—California, Colorado. Idaho, Nevada, and North Carolina—produce 95 percent of the domestic total.[16] In 1955 and 1956, Nevada, California, and North Carolina, in that order, supplied approximately 80 percent of the total output while Montana, Colorado, and Idaho produced about 17 percent.[17]

2. Composition of the industry

Because of the small number of commercial grade deposits, the major portion of domestic tungsten output has come from a small number of producers. In 1943, for example, when production reached a record high, 4 operators produced 79 percent of the total domestic output.[18]

In the immediate pre-Korean period, 1949 and 1950, 7 operators accounted for 92 and 94 percent of the domestic total, respectively.[19] These companies were Bradley Mining Co., Climax Molybdenum Co., Nevada-Massachusetts Co., Nevada Scheelite Corp. (a subsidiary of Kennametal, Inc.), Surcease Mining Co., Tungsten Mining Corp., and Union Carbide Nuclear Corp. (a subsidiary of Union Carbide Corp.). With the addition of Getchell Mines, Inc., the top 8 operators produced 87 percent in 1951, 84 percent in 1952, 72 percent in 1953, 73 percent in 1954, 73 percent in 1955, and 81 percent in 1956.[20] From 1954 on, however, Bradley Mining and Surcease Mining were displaced from the top 8 by Wah Chang Corp. and Minerals Engineering Corp.

Large numbers of small producers—approximately 700 in 1954–56—account for the balance of the production. These producers averaged less than 2,000 pounds of contained tungsten in the peak production year of 1955. This suggests that most of the producers were merely part-time prospectors.

As noted, tungsten ore must be beneficiated to increase the tungsten trioxide content to about 60 percent. The larger mine operators own milling facilities but the small operators do not. Thus, in 1956, more than 650 operators, some 90 percent of the total, did not own such facilities.[21] These either sell their ores to millers, who in many cases are large mine operators as well, or have their ores beneficiated on a toll basis. In 1956, there were some 49 mills and 2 chemical refineries for treating low-grade ores.[22]

Some of the producers of tungsten are integrated to a degree, combining mining with some manufacturing facilities. Thus, 1 of the

[15] BDSA, op. cit., supra, note 2, at p. II-2. The Boulder, Colo,. Atolia, Calif., and Yellow Pine, Idaho districts which produced nearly half of the total United States output prior to 1948, now have only small reserves left. The Yellow Pine mine, discovered in 1941, was the largest source of domestic tungsten in the Second World War. But its intensive exploitation during that period exhausted almost all of the ore body by the end of 1945.

[16] Id., at p. VI-5.

[17] Bureau of Mines, U. S. Department of the Interior, Mineral Market Reports, M. M. S. No. 2589 (Mineral Industry Surveys 1956); Bureau of Mines, U. S. Department of the Interior, Mineral Market Reports, M. M. S. No. 2650 (Mineral Industry Surveys, 1957).

[18] Bureau of Mines, U. S. Department of the Interior, Minerals Yearbook 670 (1943).

[19] Bureau of Mines, U. S. Department of the Interior, Minerals Yearbook 1235 (1949); Bureau of Mines, U. S. Department of the Interior, Minerals Yearbook 1249 (1950).

[20] These percentages are obtained from the appropriate annual issues of Minerals Yearbook and from advice received from the Bureau of Mines.

[21] H. Rept. No. 2596, 84th Cong., 2d sess., pp. 8–9 (1956).

[22] S. Rept. No. 2146, 84th Cong., 2d sess., p. 4 (1956).

2 ferrotungsten producers [23] is a subsidiary of a large mine operator. Three of the 10 producers of hydrogen-reduced metal powder are affiliated with large mine operators. Of the 3 producers of carbon-reduced metal powder, 1 is a subsidiary of 1 of the largest mine operators. Of the 11 carbide powder producers, 4 are owned by or are subsidiaries or affiliates of some of the largest mine operators. There is also some integration in the production of tungsten chemicals.[24]

II. The Government's Tungsten Expansion Program

A. NEED FOR A PROGRAM

When Korean hostilities broke out, military requirements for tungsten in high-velocity armor-piercing shells [25] increased tremendously. Increased quantities were also needed for machine tools and high temperature applications, including jet engines. Accurate estimates of military requirements were difficult because of the development of new weapons and, especially, because it was not known whether the conflict would remain localized. Nevertheless, it appeared that projected 1951 requirements for civilian and military use would exceed the total anticipated supply even through supply levels were to increase. Stockpile and military requirements, as set by the Defense Production Administration, together exceeded the total supply for all purposes. At the same time, civilian requirements alone were also estimated to require more than the total supply.[26]

Moreover, two customary ore sources had to be considered as no longer available to make up the anticipated deficit. China, which in 1950 had furnished 7.5 million of this country's imports of 8.3 million pounds of tungsten, was no longer available as a source. Korea, which ranked next to China as a source of imports in 1950, had become a battlefield and no great reliance could be placed on that source. Moreover, the stockpile seemed to be insufficient to meet the alarming supply deficit.[27]

At the outset of the program, then, it was apparent that the national security required a substantially expanded tungsten supply. Indeed, the Preparedness Subcommittee of the Senate Armed Services Committee, reporting in July 1951, termed our Nation's tungsten position as "little short of desperate."[28]

B. GOVERNMENT AGENCIES RESPONSIBLE FOR THE PROGRAM

The Defense Production Act of 1950 [29] granted the President, inter alia, a broad arsenal of powers both to expand the production and supply of commodities needed for the national security and to establish priorities and allocation controls. Both types of powers were utilized in the tungsten program.

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[23] BDSA, op. cit., supra, note 2, at pp. X-3 to X-5.
[24] Ibid.
[25] A 76-millimeter armor-piercing shell, for example, contains a core of tungsten carbide weighing 4 pounds. Preparedness Subcommittee of the Senate Committee on Armed Services, Investigation of the Preparedness Program; Tungsten, 82d Cong., 1st sess., p. 10 (committee print 1951).
[26] Ibid.
[27] Id. at p. 11. By 1946, 20.6 million pounds of tungsten had been stockpiled. Id., at p. 9. While this figure had increased by 1950–51 (id., at p. 11), the Preparedness Subcommittee report vigorously criticized the pre-Korean stockpiling of tungsten as too little and too late. Id., at pp. 1–2, 11–22, 36–38. See appendix tables 2, 5A, and 5B.
[28] Id., at pp. 36, 37.
[29] 64 Stat. 798; 50 U. S. C. App. 2061–2166 (1952).

Among the incentives employed to expand tungsten supply were loans, advances, exploration grants, guaranties of loans, and accelerated tax amortization. But these were far less important than the domestic and foreign purchase programs under which close to 95 million pounds of tungsten were procured for the Defense Production Act inventory. Simultaneous with these purchase programs, the Government was also purchasing huge quantities of tungsten for the national stockpile pursuant to the Strategic and Critical Materials Stock Piling Act.[30]

The Office of Defense Mobilization (ODM), as originally established in the Executive Office of the President by Executive Order 10193 of December 16, 1950,[31] and as subsequently established by Reorganization Plan No. 3 of June 12, 1953,[32] was designated by the President as the overall policymaking and coordinating body to exercise the President's powers under the Defense Production Act. Under ODM was the Defense Production Administration (DPA), established on January 3, 1951.[33] DPA, to which certain policymaking functions had been delegated, authorized the initiation of the domestic and foreign tungsten purchase programs in 1951 upon the advice and recommendations of the Defense Minerals Administration (DMA). DMA was an agency within the Department of Interior [34] to which the Secretary of Interior had redelegated most of the functions vested in him by Executive Order 10161 [35] "to encourage the exploration, development, and mining of critical and strategic minerals and metals." The tungsten-purchase program was certified by DPA to the General Services Administration (GSA) in March of 1951 for implementation and execution.

The Defense Minerals Administration, acting pursuant to programs and funds certified to it by DPA, also had the responsibility for deciding on applications for grants for exploration of new or undeveloped sources of critical and strategic metals and minerals, including tungsten. This function was delegated to Interior's Defense Minerals Exploration Administration (DMEA) [36] on the abolition of DMA on August 28, 1951.[37]

The granting of certificates for accelerated tax amortization was a function of DPA [38] and, on its abolition, of ODM pursuant to recommendation of the delegate agencies.

[30] 53 Stat. 811 (1939); 50 U. S. C., 98–98h (1952).

[31] 3 C. F. R. 156 (Supp. 1950).

[32] 67 Stat. 634, 5 U. S. C., sec. 133z (1952). Reorganization Plan No. 3 and Executive Order 10480, as amended, 3 C. F. R. 98 (Supp. 1953); 3 C. F. R. 134 (Supp. 1953); 3 C. F. R. 74 (Supp. 1956), transferred to the new ODM all the mobilization planning functions of the National Security Resources Board, as authorized by the National Security Act of 1947 (61 Stat. 495, 50 U. S. C., secs. 401–405 (1952); the stockpiling functions formerly exercised by the Munitions Board of the Department of Defense; and the responsibilities assigned to the former ODM, including those carried out by the Defense Production Administration under the Defense Production Act of 1950, as amended. See Executive Orders No. 10200, January 3, 1951, 3 C. F. R. 61 (Supp. 1951); No. 10281, August 28, 1951, 3 C. F. R. 463 (Supp. 1951); No. 10433, February 4, 1953, 3 C. F. R. 64 (Supp. 1953).

[33] Executive Order No. 10200, 3 C. F. R. 61 (Supp. 1951). DPA was abolished in 1953 and its functions transferred to the Office of Defense Mobilization. See footnote 32, supra.

[34] Secretary of Interior's Order No. 2605, December 4, 1950, 15 F. R. 8718.

[35] Sept. 9, 1950, 3 C. F. R. 123 (Supp. 1950).

[36] DMEA was established on August 28, 1951, within the Department of Interior, by the Secretary's Order No. 2726 (16 F. R. 3804 (1951)).

[37] Executive Order 10281, Aug. 28, 1951, 3 C. F. R. 463 (Supp. 1951), established the Defense Materials Procurement Agency (DMPA) and delegated to it certain mobilization functions which previously had been delegated to the Secretary of the Interior (DMA) and GSA. Pursuant to redelegation by DMPA, the Secretary of Interior established DMEA to administer the exploration program under the Defense Production Act. DMPA was abolished by Executive Order 10480 of Aug. 14, 1953, 3 C. F. R. 98 (Supp. 1953), and most of its functions were transferred to GSA.

[38] Executive Order 10200, 3 C. F. R. 61 (Supp. 1951). Previous to the establishment of DPA, the chairman of the National Security Resources Board exercised this function. E. O. 10172, 3 C. F. R. 140 (Supp. 1950).

At various times, DMA, DMPA, and GSA had jurisdiction to recommend to DPA and ODM the granting or denial of applications for loans and guaranteed loans to producers to help expand tungsten production.[39]

Finally, under policies and directives established by DPA and ODM, conservation and priorities and allocation orders for tungsten were issued by Commerce's National Production Authority (NPA),[40] by DMA, and by DMPA.[41]

C. CONSERVATION, PRIORITIES, AND ALLOCATIONS

By a series of orders issued in 1950 and 1951,[42] inventory controls, prohibitions, and restrictions on end-uses, and priorities and allocation controls were imposed on tungsten in its finished and intermediary forms. Thus, NPA's Order M–30 of January 22, 1951, among other things, prohibited the use of tungsten in certain specific products, limited the production and shipment of high-speed steels containing tungsten, regulated the use of ores and concentrates by steel producers and, with certain exceptions, placed deliveries of pure and intermediate forms of tungsten under allocation. NPA Orders M–80 and M–81 of August 15, 1951, which superseded Order M–30, between them placed ferrotungsten, tungsten scrap, ores and concentrates used in the manufacture of alloys, and carbon and hydrogen-reduced tungsten under full allocation as to delivery and use; continued or imposed new inventory restrictions; required use of substitutes where commercially feasible; and prohibited certain uses.

By 1953, even before the ending of Korean hostilities in July, tungsten supply had become abundant, and these controls and restrictions were removed. While they were in effect, they achieved their designed purpose to conserve tungsten supplies, to assure priorities for military uses and to allocate the balance fairly among civilian users.[43]

D. THE DOMESTIC PURCHASE PROGRAM

The domestic purchase program utilized during the Korean period can best be presented in relation to supply, consumption, and price experiences during preceding wartime periods.[44] Although second only to China as a producer of tungsten, this country is yet the world's largest importer and consumer of the metal. These factors, coupled with tungsten's close relation with war materiel, make it particularly subject to the exigencies of wartime demands, armament booms, and peacetime retrenchments. This fact has been primarily responsible for the wide fluctuations in tungsten's economic history. That history also shows the ability of both domestic and foreign producers to respond quickly to emergencies necessitating vast increases in tungsten supply.

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[39] See H. Rept. 1669, 84th Cong., 2d sess., pp. 62–71 (1956); H. Rept. 2, 84th Cong., 1st sess. (1955).

[40] NPA was established within the Department of Commerce by the Secretary's Order No. 123 (15 F. R. 6726). NPA was abolished on October 1, 1953, and its functions assigned to Commerce's Business and Defense Services Administration (BDSA) established by the Secretary's Order No. 152 (18 F. R. 6503).

[41] In general, with respect to conservation, priorities and allocations, DMA and DMPA exercised jurisdiction over tungsten in the ore and early concentrate stages; NPA had jurisdiction beyond that stage. NPA Delegation 5 (15 F. R. 9195).

[42] NPA Regulation 1 (Sept. 18, 1950), NPA Regulation 2 (Oct. 3, 1950), NPA Order M–30 (Jan. 22, 1951), DMA Order MO–4 (Feb. 13, 1951), DMA Order MO–6 (Apr. 5, 1951), DMPA Order MO–7 (Apr. 16, 1951), NPA Order M–80 (Aug. 15, 1951), NPA Order M–81 (Aug. 15, 1951). See BDSA op cit., supra, note 5, at p. IX–4; Investigation of the Preparedness Programs: Tungsten, supra, p. 27.

[43] It does not appear that any tungsten users ever complained that they were deprived of a just share of tungsten. BDSA has advised that, in general, there was sufficient tungsten to satisfy all permitted uses.

[44] Tables 2–7 set forth in the appendix show the very wide shifts in supply, consumption, and prices which have characterized this metal.

Thus, during the World War I period, domestic production increased from less than a million pounds in 1914 to a peak of 5.9 million pounds in 1917. Imports increased from less than a million pounds in 1914 to a high of 12.2 million pounds in 1918.[45] The price rose from $5.85 a short-ton unit in 1914 to as much as $85 in April 1916. Just 8 months later, it plummeted to $17. The decline thereafter gradually continued to a low point of $1.80 in 1922.[46] This precipitous decline and the competition of imports resulted in the shutting down of domestic mines. Production dropped to 311,000 pounds in 1919, and in 1921 and 1922, except for some development work, there was no domestic mine production at all. It was not until 1934 that the prewar peak of 1.7 million pounds in 1910 was exceeded.[47]

In contrast, World War II Government controls and purchase programs avoided the speculative excesses of the First World War. The total supply was increased to meet the vast wartime demand—domestic production increased from 2.9 million pounds in 1938 to a peak of 11.4 million pounds in 1943, while imports rose from 162,000 to 18.7 million pounds.[48] Prices moved through a relatively restricted range from $16 to $25 a short-ton unit prewar (1938–39) to a peak of $26 in 1943 and to $24 at the war's end (1945–46).[49]

This lack of speculative wartime excess is reflected in the postwar status of the industry. The total supply declined, with the cessation of wartime demand, to a low of 10 million pounds in 1949, of which 2.6 million was domestic production and 7.4 million was imported. Price recovered to a range of $28 to $30 a short-ton unit.

1. Price ceilings

The beginning of the Korean conflict in June 1950 brought a rapid rise in tungsten prices. Domestic tungsten, quoted at $28.50 per short-ton unit since 1948, rose to $59 by January 1951. Imported tungsten during the same period rose from $21–$22 to $61–$68.[50]

Initiation of price controls in January 1951 introduced a substantial controversy into the defense production program for tungsten. Tungsten prices were frozen as part of the Office of Price Stabilization's initial general ceiling price regulation issued on January 26, 1951. That regulation froze each seller of the affected commodities concerned, including tungsten, at the highest price he had charged bebetween December 19, 1950, and January 25, 1951, subject to future review.

The uncontrolled foreign prices, however, continued to rise, and Defense Minerals Administration asserted that unless ceiling prices were substantially raised, foreign supplies would be unavailable. It advocated a price of $70 per unit as necessary to meet supply requirements. Office of Price Stabilization proposed a ceiling price of $55, coupled with a subsidy for new production, as providing a greater stimulus to new production at less cost to Government and industry. The difference in view was compromised at a ceiling price of $65 per unit on April 6, 1951. This remained the ceiling price until March 18, 1953, when price controls were terminated.[51]

[45] See appendix table 2.
[46] See appendix table 7; BDSA, op. cit., supra, note 2, at p. VIII-2.
[47] Bureau of Mines, U. S. Department of the Interior, Minerals Yearbook 621 (1939).
[48] See appendix table 2.
[49] See appendix table 7.
[50] Investigation of the Preparedness Program: Tungsten, supra, p. 28.
[51] Bureau of Mines, U. S. Department of the Interior, 1 Minerals Yearbook 1195 (1953).

2. Floor price program

As in World War II, tungsten production was supported by an extensive Government purchase program. The methods followed, however, were considerably different. In World War II, the Government agreed to purchase all tungsten offered by "eligible" producers at a price set in advance. Eligibility under the program was determined by the size of the producer, based on 1941 production. From April 1942 to May 11, 1943, producers were not "eligible" for the Government program if their 1941 production exceeded 6,000 units. From May 11, 1943, to the end of the program on December 31, 1944, producers were not "eligible" as to any specific property which had exceeded 13,500 units in 1941. The price paid, under the Government program, began in April 1942 at $24 per unit and was increased on May 11, 1943, to $30 per unit. A producer not otherwise "eligible" could negotiate a Government contract on the general basis of the program only by showing that it was "necessary to stimulate or maintain such producer's production of domestic tungsten." [52] Under this provision, contracts were negotiated with some of the largest producers.[53]

In the Korean conflict, however, Defense Minerals Administration, on March 5, 1951, recommended to Defense Production Administration a program requiring General Services Administration to agree to buy, if tendered, domestically produced tungsten at $63 per short-ton unit of tungsten trioxide. The program was nonselective: it applied to low-cost production as well as marginal production. For example, the Tungsten Mining Corp., one of the largest producers, which shortly before had offered to contract both existing and new production at $43 a unit, was now accorded the higher price. DMA subsequently stated that, as to projects then under consideration, the $63 price was "considerably in excess" of the floor price which would be necessary to encourage expanded production.[54]

The program was certified by DPA to the General Services Administration on March 30, 1951. That agency, however, urged a floor price predicated on 1950 production to allow exclusion of production which did not need subsidy.[55] DMA asserted that its program would be necessary on administrative grounds. It believed that it would be impracticable to attempt distinction between new and existing production.[56] Its views prevailed, and a regulation covering its program was promulgated by GSA on May 10, 1951.

This regulation covering the nonselective $63 program was General Services Regulation 2 (16 F. R. 4373, May 11, 1951), issued pursuant to title III of Defense Production Act of 1950. It provided that the program would terminate when 1,468,705 short-ton units had been delivered, or on July 1, 1956, whichever occurred first. The amount was increased to 3 million short-ton units (i. e., 47,586,000 pounds of contained tungsten) by 32A C. F. R., chapter XIV, regulation 2 (Nov. 14, 1951).[57]

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[52] Investigation of the Preparedness Program: Tungsten, supra, pp. 7–8, 46–59.

[53] During World War II, the tungsten program had been relatively inexpensive and entirely successful in building up a stockpile while supplying the unprecedented consumption figure of 72.5 million pounds of contained tungsten during the 4 years, 1941–44.

[54] Investigation of the Preparedness Program: Tungsten, supra, p. 31.

[55] Id., at p. 30.

[56] In this connection, it may be noted that 7 producers accounted for 94 percent of the 1950 production. See pp. 12–13, supra.

[57] The regulation provided that an operator of a concentrating plant—by applying for a certificate of participation in the purchase program—agreed to purchase or process all suitable ores offered to the limit of plant capacity in excess of that required for his own production, at fair prices. The operator was required to file copies of his purchasing and processing price schedule with General Services Administration.

The tungsten program's divergence from the World War II example was criticized by the Preparedness Subcommittee of the Senate Armed Services Committee which noted that the World War II program had been "eminently successful in acquiring tungsten." It predicted that this failure to follow precedent would unnecessarily increase the cost of tungsten preparedness without increasing its effectiveness. The high prices offered, it said, which were "in no way contingent upon performance by the recipients," were merely an unnecessary attempt to meet "speculative" foreign prices which would subside to realistic levels if United States prices were not unduly inflated.[58]

In 1953, when domestic and foreign production were at a high level, the Korean armistic was signed. Tungsten was no longer a supply problem and Government controls were dropped. World tungsten supply was far greater than the demand. The London price, which reflects world market price, steadily declined to $19.37 per unit,[59] as against the $63 guaranteed floor price on the first 3 million units of domestic production. From the beginning of the program, up through the fiscal year 1953, the Government had been called on to take less than 10 percent of the 3 million units.[60] Thus, it appeared possible that the termination date of July 1, 1956, might arrive before the Government had been obliged to take the full 3 million units.[61] But the $63 price became particularly important to the domestic producers, with the London price dropping so low.

By Public Law 206, 83d Congress,[62] the termination date was extended to July 1, 1958. The Senate committee report on the measure stated that the primary purpose of the extension was to give producers "a period of certainty in which they may make plans and investments."[63]

By June 1956, the original purchase program of 3 million units of tungsten, at $63 per unit, was virtually complete.[64] The open market for imported concentrates gave rise to concern for the ability of the domestic industry to survive such competition.[65] It appeared, however, that defense procurement needs were no longer a real factor.[66] Accordingly, Public Law 733, 84th Congress.,[67] authorized establishment of a new Government program to purchase no more than 1,250,000 units of tungsten at $55 per unit, which would total $68,750,000. The program was to terminate on December 31, 1958. Under that program, a producer was limited to delivery of 5,000 units per month out of each mining district, which meant that a producer

[58] Investigation of the Preparedness Program: Tungsten, supra, pp. 9, 33–34, 39.
[59] Bureau of Mines, U. S. Department of the Interior, 1 Minerals Yearbook 1195 (1953).
[60] Hearings before Subcommittees of the House Committee on Appropriations, 85th Cong., 1st sess., p. 9 (committee print 1957).
[61] Through the fiscal year 1953, the domestic producers sold only a minor part of their production to the Government. Thereafter, practically all their production was sold to the Government at the $63 price because industry was able to get foreign ore at a far lower price. Virtually all of the 3 million units had been purchased by the Government as of July 1, 1956.
[62] Domestic Minerals Program Extension Act of 1953, 67 Stat. 417; 50 U. S. C. App. 2181 (Supp. IV, 1957). The other minerals covered by the act involved relatively little loss to the Government as compared with tungsten.
[63] S. Rept. No. 517, 83d Cong., 1st sess. (1953).
[64] Under this program, the 10 large producers mentioned at p. 13, supra, received 86.7 percent of the money expended for purchases of tungsten. For the varying extent of their participation, see table 8 in the appendix.
[65] H. Rept. No. 2596, 84th Cong., 2d sess., p. 4 (1956).
[66] Id., at p. 18.
[67] The Domestic Tungsten, Asbestos, Fluorspar, and Columbium-Tantalum Production and Purchase Act of 1956, 70 Stat. 579, 50 U. S. C. App. 2191 (Supp. IV, 1957). A somewhat similar measure, H. R. 6373, 84th Cong., 1st sess., had been vetoed on August 14, 1955.

could receive no more than $3,300,000 Government funds per year out of any 1 mining district.

On July 31, 1956, Congress provided for fiscal year 1957 an initial appropriation of $21 million for all 5 minerals. However, later requests for a $30 million urgent deficiency appropriation and a $40 million appropriation for fiscal year 1958 were both disapproved. In the latter action, after a review of the first 6 months' operation of the program, the House Appropriations Committee concluded that, while the measure was intended to benefit an industry of 700 producers, 86 percent of the $14,853,095 expended for tungsten went to only 11 producers. It did not believe such action was warranted as a measure of emergency protection, since the minerals on hand or on order already met long-term stockpile objectives.[68]

E. THE FOREIGN PURCHASE PROGRAM

Even prior to the initiation of a domestic purchase program, DPA on March 5, 1951, certified to GSA the necessity for instituting a program under the Defense Production Act to purchase tungsten from abroad. About $14 million was first authorized for this purpose and by September 30, 1951, GSA had purchased [69] about 5.8 million pounds of foreign tungsten.[70] Pursuant to certification by DPA of an enlarged program, GSA contracted to purchase approximately 48 million pounds of foreign tungsten.[71] GSA concluded its foreign purchase contracts by early 1953,[72] although deliveries under the contracts have continued into this year. The contracts for foreign ore totaled $179,230,000 (including cost of upgrading). Probable ultimate net cost to the Government is $96,088,000.[73]

Unlike the domestic one-price open market program, foreign purchases were on the basis of negotiated contracts at prices ranging from $42 to $72.60 a unit. In general, the contracts called for spot delivery at or below the world market prices then prevailing. In some instances, as an incentive to open new production sources, the contract called for a higher price. Delivery over a long term, in some instances up to 5½ years, was also used as an incentive.

[68] H. Rept. No. 145, 85th Cong., 1st sess., pp. 3–5 (1957).

[69] Coincident with these purchases, foreign tungsten was also being purchased under the Strategic and Critical Materials Stockpiling Act, 53 Stat. 811 (1939); 60 Stat. 596 (1946); 50 U. S. C., sec. 98–98h (1952).

[70] H. Rept. No. 1040, 82d Cong., 1st sess., p. 242 (1951); BDSA op. cit., supra, note 2, at p. IX–5.

[71] H. Rept. No. 1097, 83d Cong., 2d sess., p. 245 (1954).

[72] All contracts were executed before April 1953 except 2 relatively minor ones entered into in September 1953 pursuant to commitments made several months earlier.

[73] GSA, Report on Borrowing Authority 41 (June 30, 1957). The cost is based on actual resale of 562,252 short-ton units and the resale value of the remaining units of foreign tungstein in the DPA inventory at $24 a unit, a figure much less than the acquisition cost.

A tabulation of the foreign purchase contracts shows the following:

	Short-ton units delivered	Price	Average months of deliveries	Average price per short-ton unit
Total purchases	2,624,179	$159,542,993		$60.80
Spot purchases:				
Total	548,042	33,660,251		61.42
1951	177,651	11,048,372		62.19
1952	334,563	20,780,852		62.11
1953	35,828	1,831,027		51.11
Other purchases:				
Total	2,076,137	125,882,742	10.6	60.63
1951	208,955	19,284,489	3.3	64.51
1952	1,625,400	98,593,101	10.7	60.66
1953	151,782	8,005,152	13.9	52.74

Source: General Services Administration.

Thus, the purchase price was gradually reduced between 1951 and 1953. However, since more than 90 percent of the purchases were contracted for in 1951 and 1952, when the foreign price was at its peak, the overall average of prices—$60.80 per unit—was high.

Contrary to expectations, the Republic of Korea was able to supply a considerable volume of tungsten for our requirements. In fact, it represented 39.7 percent of the money paid under the foreign purchase program, the largest single foreign source. Korean supplies, together with the receipts from 4 private companies, accounted for over 70 percent of the total.[74]

In 1951 and 1952, the foreign purchase program operated within the framework of the International Materials Conference of which this country was a member. Established in February 1951, to cope with international problems relating to scarce materials, the Conference announced voluntary international distribution plans for the third and fourth quarters of 1951 pursuant to which the United States agreed to limit its purchases to 44.8 percent and 47.8 percent, respectively, of the estimated free world production. For the third quarter of 1951 only, the member nations other than Brazil agreed that producing nations would not demand more than $65 per short-ton unit and importing nations would pay at least $55 a unit, f. o. b. port of shipment.[75] Under the Conference's 1952 distribution plan, the United States agreed to take no more than 49.6 percent of estimated free world production.[76] By the end of 1952, tungsten supply had improved to such an extent that international distribution was thereafter unnecessary.[77]

[74] See appendix table 9 for breakdown of the foreign purchase program.
[75] Bureau of Mines, U. S. Department of the Interior, Minerals Yearbook 1287 (1951).
[76] Bureau of Mines, U. S. Department of the Interior, Minerals Yearbook 1076 (1952).
[77] International Materials Conference, Report on Operations 24 (1952–53).

F. TAX AMORTIZATION

The grant of accelerated tax-amortization privileges played a relatively minor part in the defense expansion of domestic tungsten production. In contrast to the expenditure of approximately $370 million in the domestic and foreign purchase program,[78] the total value of facilities declared eligible for accelerated tax amortization was only $4,545,000. The facilities certified included mine, mill, and storage facilities, as well as workers' housing, and the percentages eligible for accelerated amortization varied according to the type of facility covered. For purposes of this discussion, the rapid tax-amortization program is divided into two phases: that contemporaneous with Korean hostilties up to mid-1953 and that subsequent thereto.

1. From the beginning of the program to mid-1953, there were 35 applications filed and all of them had been processed by the latter date. Twenty of these were granted, covering facilities costing some $6,844,000 and authorizing accelerated depreciation to the amount of $4,401,000. Fifteen were not granted, of which 4 (totaling $1,362,000) were considered uneconomic, 5 (totaling some $117,000) were denied as expenses rather than capital investment, 3 (totaling $185,000) failed to meet the required filing date, and 3 (totaling $1,449,000) were withdrawn.

At first glance, these grants were highly concentrated. One company (Wah Chang Corp.) with its subsidiary (Black Rock Mining Co.) apparently accounted for a disproportionately large share of the grants. Thus, 9 of this company's 17 applications were certified. The total amount authorized for accelerated depreciation as a result was $3,199,000. This compares with the total amount of $1,202,000 authorized on the 18 applications of all other companies. Accordingly, Wah Chang accounted for approximately 73 percent of the total amount eligible.

Nevertheless, it does not appear that this corporation was favored at the expense of other applicants. The bulk of its grants (some $2,395,000) related to the development of a single mining installation, at Hiko, Nev., along with milling equipment and workers' housing.[79] For the most part, the other applications were for milling facilities only, and for much smaller amounts.

2. After mid-1953, there was little concern for expansion in the tungsten industry. Only $144,000 was added to the amount eligible for tax amortization. On July 23, 1953, and July 12, 1954, Wah Chang Corp. filed applications supplemental to its previously approved applications. Pursuant to these supplemental applications, $25,000 was declared eligible for accelerated tax amortization on June 8, 1954, and $39,000 was declared eligible on November 18, 1954. On an application filed by Wah Chang Corp. on July 10, 1953, $80,000 was declared eligible on March 16, 1954, in connection with storage facilities for Government-owned tungsten concentrates and powder.

Applications filed by other companies on June 17, 1954, and July 8, 1954, were denied as not within the scope of an expansion goal. The June application was for $2,576,000 covering a plant for upgrading substandard tungsten concentrates. The July application was for $165,000 covering a plant to process low-grade tungsten concentrates into synthetic scheelite.

[78] GSA, supra, p. 41.
[79] Bureau of Mines indicates that these mining facilities are no longer in operation.

Set forth below is a tabulation of the applications for tax amortization which were certified:

[Dollar amounts in thousands]

Tax amortization No.	Company-location-purpose	Applied for	Certified	Eligible	Percent	Date certified
1712	Nevada-Massachusetts Co., Tungsten, Nev.: Mill	$125	$125	$75	60	June 12, 1951
2041	Foote Mining Co., Exton, Pa.: Processing	57	55	47	85	Apr. 9, 1951
7463	Lindsay Mining Co., Mina, Nev.: Mill	349	99	59	60	Nov. 21, 1951
12518	Tungsten Mining Corp., Henderson, N. C.: Mill	1,200	1,110	555	50	Aug. 21, 1952
13202	Philip G. Smith Co., Detroit, Mich:. Scrap reclaiming	157	157	102	65	June 6, 1952
17607	Boulder Tungsten Mines, Inc., Boulder County, Colo.: Mill	72	64	48	75	June 9, 1952
23035	L & W Tungsten Co., Nye County, Nev.: Mill	33	24	17	70	Feb. 6, 1953
23675	Round Valley Tungsten Co., Bishop, Calif.: Mill	18	18	13	70	Feb. 9, 1953
24448	Salt Lake Tungsten Co., Salt Lake City: Refining	199	197	138	70	Apr. 21, 1953
2888	Union Carbide Corp., Rifle, Colo.: Metal powder	55	55	33	60	June 20, 1951
20941	Union Carbide Corp., Rovana Village, Calif.: Processing-housing	230	230	115	50	Sept. 17, 1952
	Wah Chang Corp., Glen Cove, N. Y.:					
6759	Processing	53	53	32	60	Nov. 15, 1951
6858	Supplemental to above	83	78	39	50	Feb. 4, 1952
12455	....do	61	61	36	60	Jan. 16, 1952
16747	Beneficiation and powder	290	290	145	50	July 28, 1952
24085	Supplemental to above	44	42	21	50	Apr. 6, 1953
24289	....do	13	13	6	50	Apr. 9, 1953
26182	Storage for Government-owned ores	160	160	80	50	Mar. 16, 1954
26282	Supplemental to tax amortization 16747	49	49	25	50	June 8, 1954
28234	Supplemental to above tax amortizations	78	78	39	50	Nov. 18, 1954
	Black Rock Mining Co.:[1]					
22151	Bishop, Calif.: Mine-mill-housing	802	750	525	70	Jan. 30, 1953
22166	Hiko, Nev.: Mine-mill-housing	1,430	1,395	976	70	Do.
24209	Hiko, Nev.: Mill-housing	2,028	2,028	1,419	70	Mar. 12, 1953

[1] Black Rock Mining Co. is a subsidiary of Wah Chang Corp.

Source: Office of Defense Mobilization.

G. EXPLORATION ASSISTANCE

The Government's program for tungsten expansion also embraced the encouragement of exploration for new or undeveloped sources. Beginning in April 1951, it offered to pay 75 percent of the cost of reasonable delineation and sampling of ore bodies.[80] The only liability as to repayment under the program was in the form of a royalty attaching to production from the property involved.

The tungsten exploration program was actively pursued.[81] According to advice from DMEA, as of July 31, 1957, a total of 474 applications for Government assistance were made. Of this number, 251 applications were denied, while 123 contracts were executed. In addition, 88 applications were withdrawn, and 12 were under consideration.

Ten of the executed contracts were canceled before any Government expenditures were made. Of the remainder, 50 were terminated without certification of discovery, 47 were terminated with such certification, and 16 are still in force. The Government's participation in the 113 executed but noncanceled contracts amounted to $3,501,121, of which $2,294,345 has been expended. Royalties received by the Government as of July 31, 1957, total $454,580.

[80] DMA Order MO–5, Apr. 10, 1951, superseded by DMEA Order 1 of Mar. 7, 1952, as amended, 19 F. R. 1563 (1954); 20 F. R. 337, 1608 (1955); 21 F. R. 3839 (1956).

[81] As of June 30, 1957, a total of $4,050,000 in borrowing authority funds were certified to DMEA for this program. GSA, supra, p. 41.

Six of the largest tungsten producers collectively received about 22 percent of the Government's expenditures under this program. They were Nevada Scheelite, Tungsten Mining, Minerals Engineering, Wah Chang, Bradley Mining, and Surcease Mining. The other 4 largest producers—Climax Molybdenum, Union Carbide, Nevada-Massachusetts, and Getchell—received no exploration assistance. This comparatively small percentage contrasts with the overwhelming dominance in production held by these 10 companies.[82] The balance of expenditures was spread among about 100 smaller producers, several of whom received more than some of the largest.

There is no evidence of discrimination against small operators in the program. Virtually all of the 251 denials of applications were on the basis of lack of geological probability of making significant discoveries. The extent of participation in the program by the larger producers appears to have been due only to their access to promising deposits. Large and small operators alike sought to participate in the program not only because the Government was willing to underwrite 75 percent of the financial risks once a contract was executed, but also because DMEA (through the Bureau of Mines and the U. S. Geological Survey) undertook rather extensive exploration and research, free of charge, before making a decision on an application.

While the exploration program has resulted in the development of some promising tungsten deposits, none of them are comparable in importance to Yellow Pine, Idaho, and Hamme, North Carolina—two World War II developments which have been of major significance.[83]

H. OTHER TYPES OF ASSISTANCE

1. Purchases for the national stockpile

In addition to the domestic and foreign purchase programs under the Defense Production Act of 1950, the Government has been purchasing large quantities of tungsten under the Strategic and Critical Materials Stock Piling Act.[84] The stockpile objective and the precise amount of tungsten procured under that objective are classified.[85] However, it appears from testimony of the Director of ODM in 1956 that the tungsten on hand exceeds both the minimum and long-range stockpile objectives, and that this inventory plus the tungsten on order exceeds total 5-year wartime requirements.[86]

Until December 1950, stockpile purchases included both domestic and foreign ores. Thereafter, and until February 1953 when no further stockpile contracts were executed, only foreign ores were purchased [87] since domestic production was being used by industry or was being procured under the domestic purchase program.

2. Loans, guaranties, and advances

Loans under section 302 of the Defense Production Act played only a relatively small part in the tungsten expansion program. The total of loans granted was $123,997 and all of this amount went to

[82] See pp. 12–13, supra.
[83] BDSA, op. cit., supra, note 2, at p. II–2.
[84] 53 Stat. 811 (1939), 50 U. S. C., secs. 98–98h (1952).
[85] See note 27, supra.
[86] H. Rept. No. 1, 85th Cong., 1st sess., p. 20 (1957). See also hearing before the Minerals, Materials, and Fuels Subcommittee of the Senate Committee on Interior and Insular Affairs, 85th Cong., 1st sess., p. 6 (committee print 1957).
[87] Foreign tungsten production was also encouraged by loans from this Government. Thus, early during the Korean conflict, the Economic Cooperation Administration loaned about $1 million to Portuguese miners to help expand their tungsten production. BDSA, op. cit., supra, note 2, at p. I–7.

3 comparatively small firms: Tungsten Mining & Milling Co., Washington; W. A. Noon (Henderson Tungsten Co.), Montana; and Cobb & Weldon, Colorado. As of December 31, 1956, the total balance outstanding on the loans was $49,822.[88] Thirteen other applications seeking $3,123,801 were denied for lack of essentiality or feasibility. Three applications, totaling $1,330,166, were withdrawn.

A guaranty terminating November 23, 1954, was given, under section 301 of the Defense Production Act, on a loan of $374,400 made to United States Tin Corporation of Washington for financing expansion of tin and tungsten production.[89] Three applications for guaranties, totaling $1,053,200, were denied as not economically feasible.

Under an agreement by GSA to purchase 1,405 short-ton units of tungsten, GSA made an advance of $88,109 to Boulder Tungsten Mines, Colorado, which defaulted on the contract, resulting in an estimated probable net loss of $44,701.[90] An application for an advance of $1,000,000 was withdrawn.

It does not appear that the operation of this program adversely affected small business or had any anticompetitive effects.

I. SUMMARY OF FINANCIAL ASPECTS OF THE PROGRAM

With $373,240,000 in gross transactions consummated, the tungsten expansion program is the seventh largest of all expansion programs under the Defense Production Act.[91] Its probable ultimate net cost to the Government is $217,626,000—the highest of all expansion programs under the act.[92]

The domestic and foreign purchase programs under the act account for virtually all of the gross transactions and the probable loss. The total Government expenditure for the foreign purchase program amounted to $179,230,000 on which the probable ultimate net cost to the Government is estimated at $96,088,000.[93] The total expenditure in the domestic purchase program amounted to $189,740,000, on which the probable ultimate net cost is estimated at $117,444,000.[94]

In contrast, all the other financial assistance extended by the Government under the act [95] is relatively unimportant dollarwise. The Government's expenditure under the DMEA program of exploration loans totals $2,294,345. The amount to be amortized under certificates of accelerated tax amortization is $4,545,000. Direct Government loans amounted to $123,997, of which $74,175 has been repaid; the guaranty of a loan of $374,400 has been terminated; and, on the advance to a contractor of $88,109, the probable loss is $44,701.

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[88] Joint Committee on Defense Production, Progress Report No. 38, 85th Cong., 1st sess., p. 18 (committee print 1957).

[89] The affairs of United States Tin Corp. have been the subject of congressional inquiry. H. Rept. No. 2, 84th Cong., 1st sess. (1955); H. Rept. No. 1669, 84th Cong., 2d sess., p. 62 (1956).

[90] GSA, supra, p. 41.

[91] Id., at p. 9.

[92] Ibid.

[93] Id., at p. 41. The loss is based on actual resale of 562,352 units, and the resale value at $24 a unit, of the balance of 2,053,319 units in the D-inventory acquired at a much greater cost.

[94] Ibid. This loss is based on a valuation of 2,985,483 units in the D-inventory at $24 per unit as against a cost of $63.33 per unit. On September 30, 1957, the domestic price for foreign tungsten was $12.75 to $14.25 a short-ton unit, c. i. f. United States ports, duty of $7.93 a unit extra. Engineering and Mining Journal, October 1957, p. 71.

[95] Under the Domestic Tungsten Purchase Act of 1956, 283,406 short-ton units were purchased at a cost of $15,514,946, or approximately $54.74 a unit. At a value of $24 a unit, the loss would be approximately $8,711,900.

GSA has resold approximately 573,000 units from the DPA inventory to industry and the national stockpile. Approximately $20,591,000 was received from the sales to stockpile and $13,950,000 from sales to industry. The balance of tungsten in the DPA inventory represents approximately 52.7 percent of the total cost of all 27 minerals and metals in the inventory.[96] Approximately 80 percent of tungsten in the inventory meets stockpile specifications, while the balance does not.[97]

III. Conclusions

This report, pursuant to the statute's direction, considers the impact of the defense production program on the tungsten industry. Of particular utility in weapons and heavy industry, tungsten has developed principally in a context of war or emergency. Its uses are vital, but relatively small in total tonnages. The industry which mines and produces it has remained a small part of the total economy. The richest ore sources are foreign; despite the relatively high tariff, our supply has traditionally depended heavily on imports.

The outbreak of Korean hostilities brought serious concern for tungsten supplies to meet anticipated military stockpile and civilian needs. The loss of a large foreign supply, that from China, created a need for rapid development of alternative sources. By use of incentives under the Defense Production Act, a reserve supply, adequate for 5 years' wartime needs, was brought into being; no real shortage developed for actual production needs; and new sources, both foreign and domestic, were brought into production.

The primary defense objective was ample supply; an expanded production base, although important, was secondary. Within 2 years, the program increased domestic production by 50 percent, from 6 million pounds in 1951 to 9 million pounds in 1953. At the same time, imports quadrupled from 7.5 million pounds to 29 million. And, subsequently domestic production continued to rise through 13 million pounds in 1954 to almost 16 million in 1955.

Nevertheless, tungsten remained a small industry. In the peak year of prices and production, 1955, the total value of all domestic shipments was only $60 million. Indeed, only four producers are currently mining tungsten, although others may return to operations if the economic picture changes.

Despite the substantial cost of the tungsten expansion program, it does not appear that it significantly affected the preexisting pattern of industrial competition. The incentives were available to all business segments, large or small. The purchase program, particularly, was unselective in its application between small and large producers and was available to all without consideration of the individual need for subsidy. To that extent, it necessarily favored the larger pro-

[96] Joint Committee on Defense Production, Progress Report No. 38, 85th Cong., 1st sess., exhibit 4, p. 16 (committee print 1957). More than 85 percent of the D-inventory consists of 4 materials: tungsten, titanium manganese, and columbium-tantalum (id., p. 66).

[97] Id., at p. 26 (exhibit 12). Specifications for tungsten were not identical under the Stock Piling Act and the Defense Production Act. GSA advises that tungsten which does not meet stockpile specifications may be used as is or upgraded. ODM establishes the policies to be followed by GSA in disposing of material in the DPA inventory. Under these policies, where the minimum and long-term stockpile objectives have been met, as in the case of tungsten, material will not be transferred from D-inventory to the national stockpile. Nor will sales be made to industry "without clear indication that such action will not have a seriously adverse effect upon the market prices, or create major market fears or uncertainties, and without the prior approval of the President or an official specifically designated by him." ODM Defense Mobilization Order V-3, March 18, 1954, 19 F. R. 1511 (1954). Joint Committee on Defense Production, Progress Report No. 38, 85th Cong., 1st sess., pp. 66–67 (committee print 1957).

ducers whose smaller costs and larger production required less subsidization. On the other hand, there is no evidence that small business could be a consequential factor in this industry. The scarcity of domestic ore of adequate grade, coupled with the necessity of handling large tonnages to obtain a relatively small amount of tungsten, requires capital investment generally beyond the resources of small business. Nevertheless, many small, marginal producers came into the industry in response to the defense purchases at incentive prices. These, as well as some of the better established operators, ceased production when incentive prices terminated.

At the program's end, as at its beginning, the tungsten industry was quite small. The number of significant domestic producers, as has been pointed out, is limited by the small number of adequate ore bodies. In any event, the future of our tungsten industry is precariously dependent, not on domestic competition, but upon the course of operations of the richer, more economically worked foreign supplies.

PART 2

VOLUNTARY AGREEMENTS AND PROGRAMS UNDER THE DEFENSE PRODUCTION ACT

The 1955 amendments to the Defense Production Act of 1950 require a continuous study by the Attorney General of the voluntary agreements and programs established under section 708 of that act. This part reports upon the voluntary agreements and programs currently outstanding.

There are currently 20 agreements outstanding, of which 5 are inactive. The Department of the Army is the sponsor for 17 integration committees, of which 4 are inactive pending the necessity for renewed action. Three miscellaneous agreements are under the sponsorship of the Department of the Interior, the United States Information Agency, and the Maritime Administration, respectively. The agreement sponsored by the Maritime Administration is not currently active.

A. FOREIGN PETROLEUM SUPPLY COMMITTEE

The Foreign Petroleum Supply Agreement is being continued in force. In recent consultation, the Secretary of the Interior reiterates the view that the agreement remains essential to solution of emergency problems that may threaten the free world's petroleum supply. On the basis of current review, I remain of the opinion that the agreement's actual and potential contributions to national security continue to outweigh possible anticompetitive implications.

There have been no recent meetings of the Foreign Petroleum Supply Committee. I am informed that the recruiting of a staff of Government employees, to meet the requirements of the 1956 amendments to this voluntary agreement, is continuing and is expected to be completed in the near future.

Mr. Hugh A. Stewart, Director of the Office of Oil and Gas, Department of the Interior, who formerly had served as Government Chairman of the Committee, has just been reappointed to that post.

B. ARMY INTEGRATION COMMITTEES

In my August 9, 1957, report, I stated that the Ordnance Ammunition Command had recommended that 4 of its integration committees be placed on a standby status and that staff agreement had been reached on an amendment which implements this recommendation. Subsequently, the Director of the Office of Defense Mobilization forwarded to me for approval a letter requesting the participation of the members of these committees in the plans as amended so as to place the committees in a standby status. That approval was given and the letters have been sent out. The committees which were placed in a standby status are Burster Casings, Cartridge Cases, Artillery Mechanical Time Fuzes, and Military Pyrotechnics.

Additionally, the Department of the Army had requested dissolution of the 3.5-inch Rocket Integration Committee, as this committee had served the purpose for which it had been formed. Accordingly, the Director of the Office of Defense Mobilization has withdrawn the requests sent to the participants. Formal notice of dissolution was published in the Federal Register on October 8, 1957 (22 F. R. 8008).

Three of the remaining five active integration committees administered by the Ordnance Ammunition Command have engaged in considerable productive activity during the reporting period. These committees are Propellants and Explosives, Small Arms Ammunition, and Artillery and Mortar Shell. Although the Ammunition Loading Committee has not met during this period, meetings have been scheduled for the later part of the year, and the exchange of information with representatives of the Naval Bureau of Ordnance who had attended previous meetings is continuing. This program has been of considerable value to both services. It was anticipated that the Fin Stabilized Artillery Ammunition Committee would meet during the period, but this meeting was postponed pending further developments. Members of the committee are continuing a study of new or revised specifications.

In the tank-automotive field, six integration committees are currently operative. Two committees (Light Gun Tanks and Allied Combat Vehicles, and Medium and Heavy Gun Tanks and Allied Combat Vehicles) have held meetings during the reporting period. These committees, together with the remaining four (Cast Armor for Track Laying Vehicles, Light and Medium Tactical Trucks, Tracks for Track Laying Vehicles, and Heavy Tactical Trucks), have scheduled meetings for the succeeding period. Thus, all committees will have met at least twice during 1957.

The Committee on Army Aircraft and Maintenance, sponsored by the Army Transportation Corps, has held no meetings in the last quarter. This has primarily been due to the fact the supervision of this committee was transferred from the Transportation Research and Engineering Command to the Transportation Supply and Maintenance Command. The new command has recently recieved a complete briefing on the history and current problems of the committee.

Arrangements are being completed for a meeting at the end of this year of the Signal Corps' Critical Quartz Crystal Committee. Although it has not met during this reporting period, the committee has continued its program of distributing technical information.

After a review of the information supplied by the Department of the Army, it is my opinion that all of the integration committees should be continued since their actual and potential contributions to national defense outweigh their possible adverse antitrust considerations.

C. CONTRIBUTION OF TANKER CAPACITY

As previously reported, this agreement remains in an inactive status. During the reporting period, no occasion has arisen for the reactivation of this agreement, and hence no meetings nor joint activities by the participants have been permitted. As a consequence, there is no need to weigh anticompetitive effects against its defense aspects.

D. USIA CLASSIFIED AGREEMENT

Although details of this agreement may not be described herein because of security considerations, the United States Information Agency continues to utilize this agreement and urges its continuation. In my opinion, the public interest served by this agreement continues to outweigh its anticompetitive effects.

Respectfully submitted.

HERBERT BROWNELL, Jr.,
Attorney General.

APPENDIX

TABLE 1.—*Estimated world reserves of tungsten ores, 1954*

[Tungsten trioxide (WO_3) measured, indicated, and inferred in short-ton units] [1]

Argentina	500, 000	Malaya	1, 400, 000
Australia	1, 600, 000	Mexico	100, 000
Bolivia	5, 500, 000	Nigeria	Small
Brazil	2, 500, 000	Peru	550, 000
Burma	4, 800, 000	Portugal	2, 000, 000
Canada	1, 000, 000	Southern Rhodesia	100, 000
China	134, 500, 000	Spain	650, 000
England	400, 000	Sweden	Small
France	150, 000	Tanganyika	Small
Indochina	300, 000	Thailand	500, 000
Japan	100, 000	United States	9, 000, 000
Korea	7, 000, 000	U. S. S. R.	1, 700, 000

[1] A short-ton unit is 20 pounds of WO_3.

Source: BDSA, U. S. Department of Commerce, Materials Survey—Tungsten II-2 (1956).

TABLE 2.—*United States production, imports, consumption, and average price of contained tungsten in ores and concentrates, 1914–56*

Year	United States production (shipments) [1]	General imports [2]	Imports for consumption [3]	Consumption [4]	Industrial stocks [5]	Average price for domestic production [6]
	Thousands of pounds					*Dollars per short-ton unit*
1914	942	775	299	1,717	----------	$7.32
1915	2,219	1,848	1,534	4,067	----------	29.30
1916	5,637	4,304	4,097	9,326	----------	33.98
1917	5,847	5,054	4,291	8,412	----------	18.40
1918	4,817	12,233	11,646	15,731	----------	23.24
1919	311	10,388	9,408	10,658	----------	18.02
1920	206	4,203	1,949	4,404	----------	7.86
1921	----------	2,257	1,614	2,257	----------	----------
1922	----------	2,908	1,651	2,907	----------	----------
1923	229	79	0	304	----------	10.00
1924	538	142	0	677	----------	8.47
1925	1,133	1,694	854	2,817	----------	10.57
1926	1,315	2,884	2,535	4,175	----------	11.10
1927	1,108	2,198	2,171	3,290	----------	10.37
1928	1,150	2,969	2,856	4,106	----------	10.40
1929	790	6,446	5,974	7,154	----------	13.13
1930	668	3,998	3,695	4,642	----------	12.09
1931	1,336	189	167	679	----------	11.02
1932	377	106	92	370	----------	9.20
1933	852	379	310	548	----------	9.58
1934	1,950	954	847	2,341	----------	14.57
1935	2,279	892	813	2,373	----------	13.37
1936	2,486	3,767	3,586	6,149	----------	14.83
1937	3,331	5,696	5,561	9,027	----------	19.50
1938	2,897	162	163	3,059	----------	17.31
1939	4,080	3,112	1,485	[7]	2,952	17.11
1940	5,062	9,666	5,611	9,955	2,897	20.61
1941	6,250	13,153	11,522	16,699	2,669	23.41
1942	8,882	15,410	14,326	17,389	3,772	24.12
1943	11,368	18,678	19,445	19,313	2,918	25.08
1944	9,787	18,239	18,396	19,165	1,946	23.35
1945	5,267	8,639	4,774	14,146	4,341	23.17
Average: 1939–45	7,242	12,414	10,794	16,111	3,071	22.41
1946	4,942	6,811	6,869	6,458	3,980	20.17
1947	2,945	9,002	6,018	7,812	3,712	23.43
1948	3,838	9,748	7,548	8,853	5,848	26.27
1949	2,632	7,357	6,274	4,958	5,056	26.38
1950	4,588	8,342	16,147	6,597	5,338	28.25
Average 1946–50	3,789	8,252	8,571	6,936	4,786	24.73
1951	5,973	7,533	6,377	11,410	4,272	61.02
1952	7,244	16,995	17,406	8,634	3,024	63.44
1953	9,128	29,130	28,060	7,734	4,698	62.46
1954	13,030	23,044	24,188	4,037	4,275	62.61
1955	15,619	20,789	20,700	8,967	4,025	61.79
1956	14,027	21,857	20,860	9,061	4,457	57.90
Average: 1951–56	10,837	19,890	19,599	8,307	4,125	61.54
1957 (6 months)	2,492	8,360	8,100	5,198	6,555	[7]

[1] Shipments from domestic mines.
[2] Total imports of ores and concentrates during each year, part of which was consumed during the year, and the remainder entered bonded warehouses.
[3] Total imports of ores and concentrates which were consumed each year, and withdrawals from bonded warehouses during the year irrespective of the year of importation.
[4] Apparent consumption before 1939.
[5] Industry stocks at end of period. Data not available before 1939.
[6] Price applies to domestic concentrates, f. o. b. mines, and in some instances f. o. b. custom mills.
[7] Not available.

Source: Minerals Yearbooks, U. S. Bureau of Mines (annual).

TABLE 3.—*Accumulative world production of contained tungsten in ores and concentrates, by countries, and percentage by country of total world production, for the periods 1905–38; 1939–45; 1946–50; 1951–56*

Country	1905–38		1939–45		1946–50		1951–56	
	Contained tungsten	Percent of total world production	Contained tungsten	Percent of total world production	Contained tungsten	Percent of total world production	Contained tungsten	Percent of total world production
	Thousands of pounds		*Thousands of pounds*		*Thousands of pounds*		*Thousands of pounds*	
North America:								
United States (shipments)	53,347	11.3	50,688	15.1	18,942	11.7	65,019	15.0
Canada, Cuba, Mexico	1,598	.3	3,104	.9	2,123	1.3	11,572	2.7
South America:								
Argentina	13,241	2.8	12,651	3.8	605	.3	4,457	1.1
Bolivia (exports)	31,635	6.8	37,937	11.3	12,869	8.0	26,066	6.0
Brazil (exports)	28	(1)	6,018	1.8	5,696	3.5	9,815	2.3
Chile and Peru	3,270	.7	3,350	1.0	2,531	1.6	4,836	1.1
Europe:								
France	1,830	.3	1,083	.4	2,616	1.6	6,519	1.5
Germany	2,140	.5						
Portugal	27,233	5.8	32,862	9.8	12,507	7.7	31,219	7.2
Spain	6,131	1.3	9,667	2.9	3,678	2.3	17,110	4.0
Sweden	427	.1	1,926	.5	2,055	1.3	2,661	.6
U. S. S. R.	361	.1	5,455	1.7	22,552	13.9	47,396	11.0
United Kingdom	6,071	1.2	1,491	.4	398	.2	463	.1
Others [2]	1,626	.4	89	.1	86	.1	1,007	.3
Africa: All countries [3]	2,430	.5	9,337	2.7	4,296	2.6	14,654	3.4
Asia:								
Burma	79,515	16.9	29,640	8.9	4,761	3.0	13,018	3.0
China	157,116	33.4	68,892	20.6	44,886	27.7	111,827	25.9
Indochina (French)	7,891	1.7	1,721	.5				
Japan	6,452	1.3	3,878	1.2	137	.1	3,959	.9
Korea	11,104	2.4	37,818	11.3	10,463	6.5	34,737	8.1
Malaya	23,941	5.1	1,697	.5	255	.1	658	.2
Thailand (Siam)	4,419	.9	7,055	2.1	3,972	2.5	8,832	2.0
Others [4]	949	.2	367	.1	5	(1)	420	.1
Oceania:								
Australia	24,731	5.3	7,280	2.2	6,307	3.9	14,606	3.4
New Zealand	3,212	.7	636	.2	141	.1	239	.1
Accumulative total of world production	470,698	100.0	334,642	100.0	161,881	100.0	431,090	100.0

[1] Less than 0.1 percent.
[2] Includes Austria, Czechoslovakia, Finland, Norway and Yugoslavia, and Italy.
[3] Includes Algeria, Belgian Congo (including Ruanda-Urundi), Egypt, French Morocco, Nigeria, Rhodesia and Nyasaland, Federation of South Rhodesia, South-West Africa, Tanganyika (exports), Uganda (exports), and Union of South Africa.
[4] Includes Hong Kong, India, and Indonesia.

Source: Minerals Yearbooks, U. S. Bureau of Mines (annual).

TABLE 4.—*United States production and imports of contained tungsten as percentage of total world production, 1939–56*

Year	United States production (shipments)[1]	United States imports for consumption [2]	United States total, production and imports	Total world production	Percentage: United States total of world production
	Thousands of pounds	*Thousands of pounds*	*Thousands of pounds*	*Thousands of pounds*	
1939	4,080	1,485	5,565	44,376	12.5
1940	5,062	5,611	10,673	45,726	23.3
1941	6,250	11,522	17,772	52,746	33.7
1942	8,882	14,326	23,208	53,233	43.6
1943	11,368	19,445	30,813	63,013	48.9
1944	9,787	18,396	28,183	51,629	54.6
1945	5,267	4,774	10,041	23,918	42.0
Average: 1939–45	7,242	10,794	18,036	47,806	37.7
1946	4,942	6,869	11,811	19,801	59.6
1947	2,945	6,018	8,963	27,843	32.2
1948	3,838	7,548	11,386	39,231	29.0
1949	2,632	6,274	8,906	34,825	25.6
1950	4,588	16,147	20,735	40,280	51.5
Average: 1946–50	3,789	8,571	12,360	32,396	38.2
1951	5,973	6,377	12,350	54,629	22.6
1952	7,244	17,406	24,650	72,140	34.2
1953	9,128	28,060	37,188	75,186	49.5
1954	13,030	24,188	37,218	74,044	50.3
1955	15,619	20,700	36,319	77,660	46.8
1956	14,027	20,860	34,887	77,470	45.0
Average: 1951–56	10,837	19,599	30,436	71,855	42.4
Average: 1939–56	7,476	13,111	20,587	51,542	39.9

[1] Shipments from domestic mines.
[2] Imports for consumption consist of receipts during each year for consumption and withdrawals from bonded warehouses during the year, irrespective of the year of importation.

Source: Minerals Yearbooks, U. S. Bureau of Mines (annual).

TABLE 5A.—*Tungsten ores and concentrates imported for consumption [1] into the United States, by exporting countries, 1939–56*

[Pounds, contained tungsten]

Country	1939	1940	1941	1942	1943	1944	1945	1946	1947
North America:									
Canada and Cuba		2,781		15,975	72,678	170,900		8,544	150,942
Mexico	146,637	113,867	79,801	76,300	323,129	409,789	91,137	31,976	48,700
South America:									
Argentina	76,524	762,012	515,729	2,478,622	2,335,090	2,266,856	764,391	145,178	306,098
Bolivia	96,164	1,208,595	2,895,568	6,778,891	5,097,315	7,850,382	2,450,771	2,525,312	829,062
Brazil			384	26,612	1,135,625	2,045,499	1,316,584	1,816,486	905,704
Others [1]	69,951	177,362	326,333	264,649	559,104	1,757,943	98,014	307,158	141,997
Europe:									
France								37	
Spain								113,526	114,472
United Kingdom								75,071	18,233
Portugal		322,681	371,632	234,107	312,677	42,291			107,084
Others [2]								31,386	
Africa:									
Belgian Congo			41,826	147,829		25,543	27,858	426,908	534,343
Southern Rhodesia				47,458				888,599	203,254
Union of South Africa		53,511	124,343	154,569	17,974	31,243		33,356	109,869
Others [3]		73	37,579	218,903					19,907
Asia:									
Burma	12,878	93,549			44,223	78,890			
China	899,806	1,809,526	6,575,020	3,819,599	9,140,852	3,626,221	25,073	82,514	1,650,354
Malaya	123,682	162,783	31,619						4,850
Korea									
Thailand (Siam)		196,687	410,245		104,188			92,217	533,827
Others [4]	2,876	44,417	14,237	42,757	295,165	90,720	33	123,075	110,018
Oceania:									
Australia	56,639	573,038	97,874	20,199	6,997			13,729	222,994
New Zealand								154,366	6,297
Total imports for consumption [5]	1,485,157	5,610,882	11,522,190	14,326,470	19,445,017	18,396,277	4,773,861	6,869,438	6,018,005

See footnotes at end of table, p. 28.

TABLE 5A.—*Tungsten ores and concentrates imported for consumption [1] into the United States, by exporting countries, 1939–56*—Continued

[Pounds, contained tungsten]

Country	1948	1949	1950	1951	1952	1953	1954	1955	1956
North America:									
Canada and Cuba	363, 391		10, 012		631, 380	1, 902, 713	1, 315, 952	1, 920, 708	1, 703, 782
Mexico	153, 432	21, 358	218, 112	152, 017	585, 826	813, 260	794, 482	846, 138	667, 104
South America:									
Argentina	8, 261		15, 973	295, 423	141, 640	513, 504		888, 255	2, 163, 714
Bolivia	664, 987	210, 743	1, 784, 092	692, 588	2, 940, 931	3, 273, 147	4, 896, 346	4, 601, 357	4, 146, 450
Brazil	847, 557	120, 640	810, 149	618, 899	1, 424, 182	2, 715, 841	1, 366, 767	1, 347, 273	2, 106, 809
Others [1]	40, 912	32, 619	559, 077	346, 427	378, 052	784, 060	892, 153	947, 304	1, 183, 773
Europe:									
France						592, 552	310, 789	306, 699	16, 468
Spain	181, 617	123, 473	155, 418	468, 653	2, 074, 384	3, 172, 236	3, 222, 126	1, 009, 475	445, 612
United Kingdom						34, 083		14, 860	
Portugal	12, 240	176	147, 983	997, 570	2, 674, 062	2, 712, 669	2, 118, 199	2, 000, 161	1, 341, 304
Others [2]		3, 456	57, 899		15, 996	190, 325	37, 496	122, 141	92, 327
Africa:									
Belgian Congo	116, 417	94, 884	236, 501	30, 746	37, 330	313, 651	1, 038, 664	1, 132, 040	573, 888
Southern Rhodesia	12, 728	1, 542				178, 571	158, 865	7, 991	8, 412
Union of South Africa			34, 148	650		51, 903	365, 042	328, 251	455, 352
Others [3]	11, 337			19, 096	12, 098	40, 555		3, 394	5, 895
Asia:									
Burma		5, 862	120, 925	289, 296	305, 168	1, 649, 831	1, 010, 787	527, 509	294, 660
China	3, 699, 850	4, 548, 046	7, 439, 167	18, 175	42, 318				
Malaya					367	59, 602	142, 721	127, 630	242, 964
Korea	980, 765	497, 441	2, 481, 707	705, 131	[6] 3, 923, 314	[6] 5, 901, 998	[6] 4, 289, 331	[6] 1, 721, 799	[6] 3, 081, 077
Thailand (Siam)	379, 883	383, 612	1, 043, 973	739, 519	1, 158, 183	1, 704, 271	663, 896	914, 973	450, 393
Others [4]	71, 095	152, 557	541, 672	155, 692	155, 209	111, 209	109, 443	186, 312	25, 220
Oceania:									
Australia	3, 629	77, 893	467, 787	846, 631	905, 429	1, 308, 072	1, 417, 814	1, 742, 678	1, 850, 407
New Zealand			22, 718			36, 396	37, 205	2, 580	4, 542
Total imports for consumption [5]	7, 548, 101	6, 274, 102	16, 147, 313	6, 376, 513	17, 405, 869	28, 060, 449	24, 188, 078	20, 699, 528	20, 860, 153

[1] Includes Chile, Ecuador, and Peru.
[2] Includes Belgium, Finland, Netherlands, Sweden, West Germany, and Yugoslavia.
[3] Includes British East Africa, other British South Africa, Egypt, and Nigeria.
[4] Includes French Indochina, India and dependencies, Indonesia, Japan, Hong Kong, Netherlands Indies.
[5] Imports for consumption consist of receipts during each year for consumption and withdrawals from bonded warehouses during the year, irrespective of the year of importation.
[6] Republic of Korea.

Source: Minerals Yearbook, U. S. Bureau of Mines (annual).

TABLE 5B.—*Tungsten ores and concentrates imported for consumption [1] into the United States, by exporting countries, 1939–56*

[Percent, total imports for consumption]

Country	1939	1940	1941	1942	1943	1944	1945	1946	1947	1948	1949	1950	1951	1952	1953	1954	1955	1956
North America:																		
Canada and Cuba	------	(7)	------	0.1	0.3	0.9	------	0.1	2.5	4.8	------	(7)	------	3.6	6.7	5.4	9.2	8.1
Mexico	9.8	2.0	.6	.5	1.7	2.2	1.9	.4	.8	2.0	.3	1.4	2.3	3.3	2.9	3.3	4.1	3.2
South America:																		
Argentina	5.2	13.6	4.5	17.3	12.0	12.3	16.0	2.2	5.1	.1	------	.1	4.7	.9	1.9	------	4.3	10.4
Bolivia	6.5	21.6	25.1	47.3	26.2	42.7	51.3	36.7	13.7	8.8	3.3	11.0	10.8	16.9	11.6	20.2	22.2	19.9
Brazil	------	------	.1	.2	5.8	11.1	27.6	26.5	15.1	11.2	2.0	5.0	9.7	8.1	9.7	5.7	6.5	10.1
Others [2]	4.7	3.1	2.8	1.8	2.9	9.6	2.0	4.4	2.3	.6	.5	3.5	5.5	2.2	2.8	3.7	4.6	5.6
Europe:																		
France	------	------	------	------	------	------	------	------	------	------	------	------	------	------	2.1	1.2	1.5	.1
Spain	------	------	------	------	------	------	------	1.7	1.9	2.4	2.0	1.0	7.3	11.9	11.3	13.4	4.9	2.2
United Kingdom	------	------	------	------	------	------	------	1.1	.3	------	------	------	------	------	.1	------	.1	------
Portugal	------	5.8	3.2	1.7	1.6	.2	------	------	1.8	.2	(7)	.9	15.7	15.4	9.7	8.7	9.6	6.4
Others [3]	------	------	------	------	------	------	------	.4	------	------	(7)	.3	------	.1	.7	.2	.6	.4
Africa:																		
Belgian Congo	------	------	.4	1.0	------	.1	.6	6.2	8.9	1.5	1.5	1.5	.4	.2	1.1	4.3	5.5	2.8
Southern Rhodesia	------	------	------	.3	------	------	------	13.0	3.4	.2	.1	------	------	------	.6	.6	(7)	(7)
Union of South Africa	------	.9	1.1	1.1	.1	.2	------	.5	1.8	------	------	.2	.1	------	.2	1.5	1.6	2.2
Others [4]	------	(7)	.3	1.5	------	------	------	------	.3	.1	------	------	.3	.1	2	------	(7)	(7)
Asia:																		
Burma	.8	1.7	------	------	.3	.4	------	------	------	------	(7)	.8	4.5	1.7	5.8	4.2	2.6	1.4
China	60.6	33.8	57.0	26.7	47.0	19.8	.5	1.2	27.5	49.0	72.5	46.0	.3	.3	------	------	------	------
Malaya	8.3	2.9	.3	------	------	------	------	------	------	------	------	------	------	(7)	.3	.6	.6	1.2
Korea	------	------	------	------	------	------	------	------	------	13.0	8.0	15.4	11.0	[5] 22.5	[5] 21.0	[5] 17.7	[5] 8.3	[5] 14.8
Thailand (Siam)	------	3.5	3.6	------	.5	------	------	1.3	8.9	5.1	6.1	6.5	11.6	6.7	6.1	2.8	4.4	2.1
Others [6]	.2	.8	.1	.3	1.3	.5	.1	1.8	1.9	.9	2.4	3.3	2.5	.8	.4	.4	.9	.2
Oceania:																		
Australia	3.9	10.3	.9	.2	.1	------	------	.2	3.7	.1	1.3	2.9	13.3	5.3	4.6	5.9	8.4	8.8
New Zealand	------	------	------	------	------	------	------	2.3	.1	------	------	.2	------	------	.2	.2	.1	.1
Total imports for consumption [1]	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

[1] Imports for consumption consists of receipts during each year for consumption and withdrawals from bonded warehouses during the year, irrespective of the year of importation.
[2] Includes Chile, Equador, and Peru.
[3] Includes Belgium, Finland, Netherlands, Sweden, West Germany, and Yugoslavia.
[4] Includes British East Africa, other British South Africa, Egypt, and Nigeria.
[5] Republic of Korea.
[6] Includes French Indochina, India and dependencies, Indonesia, Japan, Hong Kong, Netherlands Indies.
[7] Less than 0.1 percent.

Source: Minerals Yearbooks, U. S. Bureau of Mines (annual).

TABLE 6.—*Production of tungsten ores and concentrates in selective countries, and United States imports for consumption as a percentage for the periods: 1939–45, 1946–50, 1951–56*

[Thousands of pounds, contained tungsten]

Country and years	Production	United States imports for consumption [1]	Percent imports	Country and years	Production	United States imports for consumption [1]	Percent imports
Canada, Cuba, Mexico:				Burma:			
1939–45	3,104	1,503	48.4	1939–45	29,640	230	0.8
1946–50	2,123	1,006	47.4	1946–50	4,761	127	2.7
1951–56	11,572	11,333	97.9	1951–56	13,018	4,077	31.3
Bolivia:				China:			
1939–45	[2] 37,937	26,198	69.1	1939–45	68,892	25,986	37.7
1946–50	[2] 12,869	6,014	46.7	1946–50	44,886	17,420	38.8
1951–56	[2] 26,066	20,551	78.8	1951–56	111,827	60	.1
Brazil:				Korea:			
1939–45	[2] 6,018	4,525	75.2	1939–45	37,818		
1946–50	[2] 5,696	4,501	79.0	1946–50	10,463	3,960	37.8
1951–56	[2] 9,815	9,580	97.6	1951–56	34,737	[4] 19,623	56.5
Portugal:				Thailand (Siam):			
1939–45	32,862	1,283	3.9	1939–45	7,055	711	10.1
1946–50	12,507	267	2.1	1946–50	3,972	2,434	61.3
1951–56	31,219	11,844	37.9	1951–56	8,832	5,631	63.8
Spain:				Australia:			
1939–45	9,667			1939–45	7,280	755	10.4
1946–50	3,678	689	18.7	1946–50	6,307	786	12.5
1951–56	17,110	10,392	60.7	1951–56	14,606	8,071	55.3
Africa: All countries: [3]				Total production: All countries:			
1939–45	9,337	929	9.9	1939–45	334,642	65,560	22.6
1946–50	4,296	2,724	63.4	1946–50	161,881	42,857	26.5
1951–56	14,654	4,762	32.5	1951–56	431,090	117,591	27.3

[1] Imports for consumption consist of receipts during each year for consumption and withdrawals from bonded warehouses during the year, irrespective of the year of importation.

[2] Exports.

[3] Includes Algeria, Belgian Congo (including Ruanda-Urundi), Egypt, French Morocco, Nigeria, Rhodesia and Nyasaland, Federation of Southern Rhodesia, South-West Africa, Tanganyika (exports), Uganda (exports), Union of South Africa, and British East Africa.

[4] Imports for consumption from Republic of Korea during the period 1952–56.

Source: Minerals Yearbooks, U. S. Bureau of Mines (annual).

TABLE 7.—*Prices of tungsten ores and concentrates, basis 60 percent WO_3, f. o. b. New York City, 1900–56*

[In dollars per short ton unit]

Year	Price range, domestic and foreign [1]	Year	Price range, domestic and foreign [1]
1900	2.00– 3.50	1913	6.00– 7.50
1901	2.50– 3.00	1914	5.85– 9.00
1902	2.50– 4.50	1915	5.90–67.50
1903	1.85– 3.60	1916	17.00–85.00
1904	4.00– 7.50	1917	16.80–26.50
1905	5.00– 6.00	1918	12.00–26.00
1906	5.50– 9.50	1919	6.00–15.00
1907	5.00–11.00	1920	4.00–10.00
1908	4.25– 6.00	1921	2.00– 3.00
1909	5.00– 7.50	1922	1.80– 8.50
1910	6.50– 8.50	1923	7.50–10.00
1911	4.50– 7.50	1924	7.50–10.00
1912	5.50– 7.50		

Year	Price range		Year	Price range	
	Domestic	Foreign,[1] duty paid		Domestic	Foreign,[1] duty paid
1925	9.50–12.75	9.00–12.50	1942 [2]	26.00	24.00
1926	10.50–13.50	10.50–12.50	1943 [2]	26.00	24.00
1927	10.50–11.50	10.25–11.00	1944 [2]	24.00–26.00	24.00
1928	10.50–11.50	10.25–11.25	1945	24.00–24.50	24.00
1929	12.00–16.50	11.75–18.00	1946	24.00	22.00–24.00
1930	13.00–16.50	11.50–15.50	1947	24.00–32.00	22.00–33.00
1931	9.50–12.00	11.00–12.00	1948	28.00–30.00	23.50–30.00
1932	9.00–11.50	10.25–11.00	1949	28.50	18.00–25.25
1933	8.00–15.00	9.00–15.00	1950	[3] 28.50–47.00	17.50–56.00
1934	16.50–19.00	14.50–19.00	1951	[3] 65.00	[4] 65.00–73.00
1935	14.50–16.50	15.00–17.00	1952	[3] 65.00	[4] 51.50–65.00
1936	14.00–16.00	14.00–16.25	1953	[3] 63.00–65.00	[4] 24.00–48.00
1937	16.00–34.00	15.00–35.00	1954	[3] 63.00	[4] 16.00–30.00
1938 [2]	16.00–25.00	17.00–25.00	1955	[3] 63.00	[2 4] 25.75–34.50
1939 [2]	16.00–25.00	18.00–23.75	1956	[3] 55.00–63.00	[2 4] 28.25–34.50
1940 [2]	21.00–24.00	23.00–24.50	1957 (6 months)	[3 5] 55.00	[4] 15.75–27.75
1941 [2]	23.50–27.00	23.00–26.00			

[1] Before 1946, foreign quotations for Chinese wolframite.
[2] Basis 65 percent WO_3.
[3] Concentrates f. o. b. mine or mill.
[4] Duty extra, c. i. f. United States port.
[5] GSA price, suspended.

Source: Engineering and Mining Journal.

TABLE 8.—*DPA domestic purchase program: 10 large producers*

Company	Short-ton units, WO_3	Dollars	Dollars	
			Percent of total	Accumulative percent
Total program	2,968,724	186,075,032	100.0	100.0
Union Carbide Corp	693,132	43,667,321	23.5	23.5
Wah Chang Corp.[1]	523,459	32,886,392	17.7	41.2
Tungsten Mining Corp	437,027	27,531,826	14.8	56.0
Getchell Mines, Inc	258,400	16,133,866	8.7	64.7
Nevada-Massachusetts Co	192,781	12,143,018	6.5	71.2
Minerals Engineering Co	184,666	11,452,919	6.2	77.4
Nevada Scheelite Corp.[2]	150,466	9,453,807	5.1	82.5
Bradley Mining Co	84,579	5,313,838	2.9	85.4
Surcease Mining Co	31,694	1,991,895	1.1	86.5
Climax Molybdenum Co	6,951	437,927	.2	86.7
Total, all other companies	405,569	25,062,223	13.3	100.0

[1] Includes Wah Chang Smelting & Refining Company of America, Inc., and Wah Chang Mining Corp.
[2] Division of Kennametal, Inc.

Source: General Services Administration.

TABLE 9.—*DPA foreign purchase program*

Company	Short ton units WO_3	Short ton unit percent of total	Dollars	Percent of total	Accumulative percent
Total program	2,624,179	100.0	159,542,993	100.0	100.0
Republic of Korea	975,000	37.2	63,375,000	39.7	39.7
Wah Chang Corp	315,546	12.0	20,706,799	13.0	52.7
Beralt Tin & Wolfram, Ltd	273,000	10.4	15,398,500	9.7	62.4
Minerales de Compostella	137,924	5.3	7,666,420	4.8	67.2
Compania Minera Moctezuma	128,836	4.9	6,570,636	4.1	71.3
British Italian Trading Co	74,622	2.8	4,733,138	3.0	74.3
Korea Tungsten Mining Co	73,424	2.8	4,554,416	2.9	77.2
Philipp Bros., Inc	47,928	1.8	2,827,702	1.8	79.0
Derby & Co., Inc	42,669	1.6	2,434,023	1.5	80.5
Compania Minera Celta	42,990	1.6	2,364,450	1.5	82.0
Abdon Merladet	46,800	1.8	2,363,400	1.5	83.5
Metallurg, Inc	32,851	1.3	2,052,558	1.3	84.8
Metal Traders, Inc	24,005	.9	1,523,247	1.0	85.8
Minerales y Metales S. R. L	20,838	.8	1,458,660	.9	86.7
Continental Ore Corp	22,650	.9	1,443,175	.9	87.6
Total all other companies	365,096	13.9	20,070,869	12.4	100.0

Source: General Services Administration.

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